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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,322	09/12/2003	Laxmi Priya Parida	YOR920030299US1	9308
7590 Ryan, Mason & Lewis, LLP Suite 205 1300 Post Road Fairfield, CT 06430			EXAMINER COUGHLIN, PETER D	
			ART UNIT 2129	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/661,322

**Applicant(s)**

PARIDA ET AL.

**Examiner**

PETER COUGHLAN

**Art Unit**

2129

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 April 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-35 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## Detailed Action

1. This office action is in response to an AMENDMENT entered April 7, 2008 for the patent application 10/661322 filed on April 7, 2008.
2. All previous Office Actions are fully incorporated into this Final Office Action by reference.
3. Examiner's Comment: Although, the terms 'carrier wave' or 'carrier signal' is not specifically mentioned within the specification, the Examiner will exclude these interpretations wherein the context of 'medium' is disclosed.

### ***Status of Claims***

4. Claims 1-35 are pending.

### ***Specification Objection***

5. The amendment filed 10/03/2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The original

specification pertains only to discovering permutation patterns with a domain of being an 'abstract problem.' By crossing out 'abstract' the applicant is introducing problems that are both 'abstract' and other domains as well. (page 3:16-26) On page 2:4 through page 3:14 describes applications which are not based in 'abstract problem' solving domain which was presented in the original specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 20 and 29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claim state the ability to 'process co-located elements discovered in said input string.' The term 'co-located element' is not defined or even mentioned within the specification.

These claims must be amended or withdrawn from consideration.

Claims 31, 33, 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims state that relationship is functional. This is not described within the specification. There is no definition of 'functional relationship.' In fact, using the excepted definition of a function, the relationship is not functional.

For example the lets assign the following permutation patterns a set of labels.

Pattern	Label
2, 1	2
1, 1	3
1, 2	4
2, 3	5
4, 3	6
3, 2	7
3, 4	8

Then the following permutation patterns will be relabeled.

Pattern	Label
2, 1, 1, 1	5
1, 2, 1, 1	6
1, 1, 2, 1	7
1, 1, 1, 2	8

So what is the practical application in relabeling the permutation of 1, 2, 1, 1 into 6? Considering the permutation pattern already has a label of 1, 2, 1, 1.

Let's add the following assignment of permutation patterns and label set

Pattern	Label
---------	-------

Art Unit: 2129

0, 0	9
9, 9	10
6, 10	11

This result with the following permutation pattern of 1, 2, 1, 1, 0, 0, 0 is labeled as 11.

#### Summarizing

Pattern	Label
1, 2, 1, 1	6
1, 2, 1, 1, 0, 0, 0	11

Thus with 1 'a' component, 2 'b' components, 1 'c' component and 1 'd' component as a permutation pattern results in 2 different labels and thus is not functional.

These claims must be amended or withdrawn from consideration.

Claims 30, 32, 34 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. These claims state that the 'relationship is 'structural.' 'The word 'structural' is not mentioned within the specification and is not a common term within the art. The Examiner has no idea what is meant by 'structural.'

These claims must be amended or withdrawn from consideration.

**35 USC § 101**

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-35 are rejected under 35 U.S.C. 101 for nonstatutory subject matter. The computer system must set forth a practical application of that § 101 judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77. The invention is ineligible because it has not been limited to a substantial practical application. The application is an algorithm that searches for patterns along a one-dimensional array. There has to be an application for this method to be employed with to have a useful purpose. Additionally, the claims describe preemption. The statement 'providing said permutation patterns for utilization in said application that processes said relationship between said groups of said characters identified by said permutation patterns' describe no specific application. This statement describes the use of the invention can be used for any application that processes a relationship between groups of characters. 'Utilization in an application' means 'utilization' in any application' thus disclosing preemption. 'Characters' are not limited to a specific application thus disclosing preemption.

The claims are also rejected under lack of concreteness. As explained above the permutation pattern of 1, 2, 1, 1 has a different result from the permutation pattern of 1, 2, 1, 1, 0, 0, 0, 0. Both have the same number of permutations within a specific index

In determining whether the claim is for a "practical application," the focus is not on whether the steps taken to achieve a particular result are useful, tangible and concrete, but rather that the final result achieved by the claimed invention is "useful, tangible and concrete." If the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101.

The application describes open ended uses which is equivalent to preemption. There must be one invention per application.

Finding patterns in strings at an academic level is not clear in its purpose or scope. There has to be a reason for finding such strings and their usefulness in a real world application, is questioned. The application as it stands is strictly an academic exercise with no useful and tangible function and/or result.

The invention must be for a practical application and either:

- 1) specify transforming (physical thing) or
- 2) have the FINAL RESULT (not the steps) achieve or produce a  
useful (specific, substantial, AND credible),  
concrete (substantially repeatable/ non-unpredictable), AND  
tangible (real world/ non-abstract) result.

Claims that recite an algorithm with given parameters with no reason why and no stated use are not statutory.



Claims that recite preemption are non-statutory and must be amended to limit the practical application to a single purpose or function.

Claims that lack concreteness are non-statutory under 35 U.S.C. §101.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-17, 20-26, 29, 30-35 are rejected under 35 U.S.C. 102(b) (hereinafter referred to as **Floratos**) being anticipated by Floratos, 'DELPHI: A pattern-based method for detecting sequence similarity'.

Claim 1.

Floratos anticipates selecting a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string (**Floratos**, p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When is search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); determining one or more values for how many of the at least one new character are in the portion of the input string (**Floratos**, p457 C1:26 through C2:4; 'Determining one or

more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern query 'Q'); determining which, if any, names in a plurality of sets of names have changed by selection of the new portion, the plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set, and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos**, p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and using changes in the names to determine the permutation patterns; (**Floratos**, p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos**, abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

Floratos anticipates the at least one processor (**Floratos**, p471, C1:6-32) is further configured, in order to determine the plurality of levels (**Floratos**, p457, C1:26-43; 'Plurality of levels' determination is preformed by 'level of our pattern discovery algorithm' of Floratos.): to determine the first set by determining values of how many of each of the characters of the alphabet are in the previously selected portion (**Floratos**, C457, C1:26-43; 'How many of each characters' of applicant is equivalent to 'density' of Floratos.); and to determine the additional sets by assigning names for a given additional set to selected pairs of names from another of the sets, wherein each assigned name is unique to the names for a selected pair. (**Floratos**, p456 C2:44 through p457 C1:7; 'Assigning names' of applicant is equivalent to 'offset list' of Floratos.)

Claim 3.

Floratos anticipates wherein the assigned names are codes. (**Floratos**, p456, C2:20-38; In this example the code is ("A.CH..E"))

Claim 4.

Floratos anticipates wherein the codes are natural numbers. (**Floratos**, p457, C1:17-25; Floratos illustrates the 'backbone' which indicates the importance of location among the query pattern. For example the 'backbone' of the sample in claim 3 would be "1011001".)

Claims 5 and 22.

Floratos anticipates wherein the at least one processor (**Floratos**, p471, C1:6-32) is further configured, when determining which, if any, names in a plurality of sets of names have changed determines that a name has changed to determine that a new name is needed for the changed name. (**Floratos**, p457 C2:44 through p458 C2:15; 'Set of names' of applicant is equivalent to ' $\pi$ ' (or set of  $\langle L, W \rangle$  patterns). The process of 'determining' of applicant is equivalent to 'pattern matching' of Floratos.)

Claim 6.

Floratos anticipates wherein the step of determining which, if any, names in a plurality of sets of names have changed further comprises the step of selecting a new name, not currently in use in the sets of names, for the changed name. (**Floratos**, p458 C1:5 through C2:15 and Figure 1; This pertains to the generation of hash values for every substring. 'New name' of applicant is equivalent to 'hash value' of Floratos.)

Claims 7 and 23.

Floratos anticipates wherein the at least one processor (**Floratos**, p471, C1:6-32) is further configured to determine, for a name that has changed in the sets of names, a location in the input string that corresponds to the changed name. (**Floratos**, p458 C1:5 through C2:32 and Figure 2; A hash table will 'point' to a particular list of offsets of a substring.)

Claim 8.

Floratos anticipates wherein the changed name corresponds to at least two characters of the input string and a location in the input string of a given character of the at least two characters is chosen as the determined location. (**Floratos**, Figures 1 and 2; The generation of hash values is based at least two characters and using the hash values to generate a hash table which 'points' to the beginning of a substring.)

Claims 9 and 24.

Floratos anticipates wherein each of the names in the sets of names corresponds to a pattern, and wherein the at least one processor (**Floratos**, p471, C1:6-32) is further configured, when using changes in the names, to select permutation patterns from the patterns. (**Floratos**, p458 C2:16-32; 'Select permutation patterns' of applicant is equivalent to finding two residues of a substring.)

Claim 10.

Floratos anticipates the step of comparing names that have changed in the sets of names to a database comprising a plurality of stored names. (**Floratos**, p458 C2:46 through p459 C1:4; Floratos illustrates comparing two names that share the same location.)

Claims 11 and 25.

Floratos anticipates wherein the additional sets have names corresponding to only a single pair of names from another set. (**Floratos**, p459, C1:5-22; The 'pair of names' of applicant are 'chained' by Floratos resulting in 'additional sets' of applicant.)

Claims 12 and 26.

Floratos anticipates wherein the at least one processor (**Floratos**, p471, C1:6-32) is further configured, when using changes in the names to determine permutation patterns, to correlate the changed names with permutation patterns. (**Floratos**, p457 C2:44 through p458 C2:32; 'Determine permutation patterns' and 'correlate' of applicant is equivalent to 'searching' and 'pattern matching' of Floratos.)

Claim 13.

Floratos anticipates wherein the step of determining which, if any, names in a plurality of sets of names further comprises, for each changed name, updating a count corresponding to that changed name (**Floratos**, p458 C2:16-32; 'Updating count' of applicant is equivalent to 'increment by one' of Floratos.), and wherein the method further comprises the step of: performing the steps of selecting, determining one or more values, and determining which, if any, names in a plurality of sets of names until the entire input string has been selected. (**Floratos**, p458 C2:16-32; 'Until the entire input string' of applicant is equivalent to when the counter C, is  $C[i]$  equals  $(n-1)$  of Floratos.)

Claim 14.

Floratos anticipates wherein portions selected have a predetermined size, and wherein the method further comprises the step of selecting a number of predetermined sizes and performing the steps of selecting, determining one or more values, and determining which, if any, names in a plurality of sets of names for each of the predetermined sizes. (**Floratos**, p459 C2:18 through p460 C1:7; 'Determining one of more values' of applicant is equivalent to 'L, W and  $K_{\min}$ ' of Floratos.)

Claim 15.

Floratos anticipates wherein the step of using changes further comprises the step of determining permutation patterns corresponding to counts greater than or equal to a predetermined count. (**Floratos**, p462 C2:5 through p463 C1:17; Here Floratos illustrates an example of permutation patterns where  $k_{\min} = 15$  and only patterns with support of 15 or higher are counted.)

Claim 16.

Floratos anticipates the step of determining maximal permutation patterns from the determined permutation patterns. (**Floratos**, p457 C1:8-14)

Claim 17.

Floratos anticipates the step of determining which, if any, names in a plurality of sets of names further comprises the step of determining location lists for each of the

names corresponding to permutation patterns (**Floratos**, p458 C1:5 through C2:32 and Figure 2; 'Location lists' of applicant is equivalent to 'hash table' of Floratos.), and wherein the step of determining maximal permutation patterns further comprises the steps of comparing location lists for permutation patterns and eliminating duplicate permutation patterns by using the location lists. (**Floratos**, p458 C2:33 through p459 C1:22; 'Eliminating duplicate permutation patterns' of applicant is accomplished by 'chaining' of Floratos.)

Claim 20.

Floratos anticipates a memory (**Floratos**, p471, C1:6-32) ; at least one processor coupled to the memory, the at least one processor configured: to select a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string (**Floratos**, p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When in search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); to determine one or more values for how many of the at least one new character are in the portion of the input string (**Floratos**, p457 C1:26 through C2:4; 'Determining one or more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern query 'Q'); determine which, if any, names in a plurality of sets of names have changed by selection of the new portion, the



Art Unit: 2129

plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set, and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos**, p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and to use changes in the names to determine the permutation patterns. (**Floratos**, p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos**, abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

## Claim 29.

Floratos anticipates a computer readable medium (**Floratos**, p471, C1:6-32) containing one or more programs which when executed implement the steps of: selecting a new portion of the input string, the new portion differing from a previously selected portion of the input string by at least one new character of the input string

(**Floratos**, p457 C1:26 through C2:4; 'Window size' of applicant is equivalent to 'W' of Floratos. When in search mode the method searches at strings of width W. Since a string is being searched this is done by inputting a new portion of the string on one end of the width and removing an old portion at the other end of the width. Must like a window of size 'W' moving down a one-dimensional array. ); determining one or more values for how many of the at least one new character are in the portion of the input string (**Floratos**, p457 C1:26 through C2:4; 'Determining one or more values' of applicant is equivalent to 'L' of Floratos. Where 'L' is the number of matches in a pattern query 'Q'); determining which, if any, names in a plurality of sets of names have changed by selection of the new portion, the plurality of sets comprising a first set and a plurality of additional sets, wherein the first set corresponds to all of the characters in the alphabet and to values of how many of the characters of the alphabet are in the previously selected portion, wherein the values are names for the first set, and wherein each additional set comprises names corresponding to selected pairs of names from a single other set (**Floratos**, p457 C2:5-15; 'First set' of applicant is equivalent to 'query sequence (Q)' of Floratos. 'Additional sets' of applicant is equivalent to matches of 'Q' 'Single other set' of applicant is equivalent to 'D' of Floratos.); and using changes in the names to determine the permutation patterns. (**Floratos**, p457 C1:26-43; Each 'permutation patterns' of applicant is disclosed by the algorithm which produces as output the complete set of all of the maximal (L, W) patterns that appear in at least K of the sequences in the set D of Floratos.) and providing said permutation patterns for utilization in said application that processes co-located elements discovered in said

Art Unit: 2129

input string and that process said relationship between said groups of said characters identified by said permutation patterns. (**Floratos**, abstract; 'Utilization' of applicant is illustrated by the 'discovery [of] weak but biologically important similarities' of Floratos.)

Claims 30, 32, 34

Floratos anticipates wherein the relationship is structural. (**Floratos**, p456, C2:20-38; 'Structural' of applicant is equivalent to "structural" of Floratos.)

Claims 31, 33, 35

Floratos anticipates wherein the relationship is functional. (**Floratos**, p456, C2:20-38; 'Functional' of applicant is equivalent to 'functional' of Floratos.)

#### Response to Arguments

7. Applicant's arguments filed on April 7, 2008 for claims 1-35 have been fully considered but are not persuasive.

8. In reference to the Applicant's argument:

REMARKS

Art Unit: 2129

The present application was filed on September 12, 2003 with claims 1 through 29. Claims 30-35 were added in the Voluntary Amendment dated October 3, 2007. Claims 1 through 35 are presently pending in the above-identified patent application. Claims 1, 20, and 29 are proposed to be amended herein.

In the present Office Action, the Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. § 132(a) because it introduces new matter into the disclosure and rejected claims 30-35 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Examiner rejected claims 1-35 under 35 U.S.C. § 101 for nonstatutory subject matter, and rejected claims 1-17, 20-26, and 29-35 under 35 U.S.C. § 102(b) as being anticipated by Floratos, "DELPHI: A Pattern-based Method for Detecting Sequence Similarity.,"

#### Formal Objections

The Examiner objected to the amendment filed on October 3, 2007 under 35 U.S.C. § 132(a) because it introduces new matter into the disclosure. In particular, the Examiner asserts that, by crossing out the word "abstract," the Applicant is introducing problems that are both "abstract" and other domains as well (page 3, lines 16-26). The Examiner asserts that pages 2-3 describe applications which are not based in an "abstract problem" solving domain which was presented in the original specification.

Applicants note that the original disclosure teaches that "the abstract problem of discovering permutation patterns is formed as a discovery problem." (Page 4, lines 7-10). The adjective "abstract" referred to the "problem of discovering permutation patterns." Contrary to the Examiner's assertions, the adjective "abstract" did not refer to the domains to which the discovery of permutation patterns applied. A person of ordinary skill in the art would recognize that the claimed invention is applicable to many domains, including those cited by the Examiner (as described on pages 2-3).

#### Examiner's response:

The original specification stated that the invention for solving 'the abstract problem of discovering permutations patterns (§10019).' When the applicant's representative tried to overcome the 35 U.S.C. § 101 rejection, the Examiner pointed out this paragraph as evidence that the invention does not provide a practical application and is only an exercise within the realm of being abstract. Altering the specification by removing 'abstract' introduces real world applications and thus is

Art Unit: 2129

considered new matter. With the applicant's representative current argument, 'A person of ordinary skill in the art would recognize that the claimed invention is applicable to many domains, including those cited by the Examiner (as described on pages 2-3)', is now introducing the application to preemption. The Formal Objection along with the Office Action stands.

9. In reference to the Applicant's argument:

#### Section 112 Rejections

Claims 30-35 were rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. Regarding claims 31, 33, and 35, the Examiner notes that these claims recite that the relationship is functional, and asserts that there is no definition of "functional relationship" and that, using the excepted definition of a function, the relationship is not functional.. Regarding claims 30, 32, and 34, the Examiner notes that these claims recite that the relationship is structural, and asserts that the word "structural" is not recited within the specification and is not a common term within the art..

Applicants maintain that the terms "functional relationship" and "structural relationship" are well understood by a person of ordinary skill in the art.. For example, the terms "structural" or "functional" are a rationale for looking at permutation patterns of, for instance, genes, i.e., genes that appear in a completely different order. These genes may have structural and/or functional relations, although they may appear in different orders in the chromosomes

Examiner's response:

There is no definition of what the applicant means by 'structural.' One of many possibilities of what 'structural' could be an 'algorithm.' If this is the case, what is the algorithm? The argument "'functional relationship" and "structural relationship" are well

Art Unit: 2129

understood by a person of ordinary skill in the art' still does not explain what it is. Office

Action stands.

10. In reference to the Applicant's argument:

#### Section 101 Rejections

Claims 1-35 were rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter.. In particular, the Examiner asserts that the invention has not been limited to a substantial practical application and that the claims describe preemption.. The Examiner asserts that the phrase "utilization in an application" means "utilization in any application" thus disclosing preemption and that "characters" are not limited to a specific application thus disclosing preemption..

In the Response to Arguments section of the present Office Action, the Examiner asserts that the statement "the existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101" is contrary to MPEP 2106. In the Examiner's Answer dated August 3, 2007, the Examiner asserted that the claims fail to provide a tangible result, and notes that there must be a practical application. The Examiner asserted that 1) the Appellant admits to unknown uses for the invention; 2) relies on "Background" to supply a practical application of the invention; and 3) admits (in paragraph 0019) that the invention is an 'abstract problem '.

Regarding the Examiner's assertion that the statement is contrary to MPEP 2106, Applicants find no comments in MPEP 2106 regarding "unknown uses" for an invention that are in addition to the disclosed uses of an invention. Applicants note that any invention may have, in addition to the known uses, other unknown uses..

Regarding the Examiner's assertion that the Applicant admits to unknown uses for the invention, Applicants note that, as described below, the disclosure clearly identifies practical applications of the invention. The existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101. In addition, independent claims 1, 20, and 29 have been amended to require providing said permutation patterns for utilization in an application that processes co-located elements discovered in said input string and that processes a relationship

Art Unit: 2129

between groups of said characters identified by said permutation patterns. Applicants maintain that this amendment limits the claims to a practical application.

Regarding the Examiner's assertion that the Applicant relies on "Background" to supply a practical application of the invention, please note that the specification has also been amended to include the practical application(s), as disclosed in the "Background" section, in the "Detailed Description" section. Contrary to the Examiner's assertion, the cited amendment places the description of a gene analysis application in the Detailed Description section of the application and therefore provides guidance for an exemplary practical application of at least one aspect of the present invention..

Regarding the Examiner's assertion that the Applicant admits (in paragraph 0019) that the invention is an 'abstract problem,' Applicants note that the term "abstract" was used in a technical sense, and not as a legal admission in the context of statutory subject matter. In any case, the specification has been amended to change "abstract problem" to "problem" in paragraph 0019. In addition, as noted above, the adjective "abstract" did not refer to the domains to which the discovery of permutation patterns applied..

Finally, as previously noted, the Supreme Court has stated that the "Transformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim.." Gottshall( v. Benson, 409 U S 63, 70, 175 U S P.Q. (BNA) 676 (1972). In other words, claims that require some kind of transformation of subject matter, which has been held to include intangible subject matter, such as data or signals, that are representative of or constitute physical activity or objects have been held to comply with Section 101. See, for example, In re Warmerdam, 31 U.S.P.Q.2d (BNA) 1754, 1759 n.5 (Fed. Cir 1994) or In re Schrader, 22 F.3d 290, 295, 30 U.S.P.Q.2d (BNA) 1455, 1459 n.12 (Fed Cir 1994).

Thus, as expressly set forth in each of the independent claims, the claimed methods or system describe discovering permutation patterns from an input string having a plurality of characters, each character being from an alphabet, and transform the input string to permutation patterns. This transformation to permutation patterns provides a useful, concrete and tangible result. For example, the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins. Thus, contrary to the Examiner's assertion that no function or application has been stated for the invention, Applicants note that the Background and Detailed Description sections of the present disclosure describe how such permutation patterns are utilized in medical applications related to genes and proteins (see, page 1, line 12, to page 2, line 20). The final result of the cited claims, i.e., permutation patterns, are useful, concrete and tangible results.

Art Unit: 2129

Applicants submit that each of claims 1-29 ate in full compliance with 35 U.S.C. § 101, and accordingly, respectfully request that the rejection under 35 U.S.C. § 101 be withdrawn.

Examiner's response:

MPEP section 2106 states.

\*\* 35 U.S.C. 101 defines four categories of inventions that Congress deemed to be the appropriate subject matter of a patent\*:< processes, machines, manufactures and compositions of matter. The latter three categories define "things" >or "products"< while the first category defines "actions" (i.e., inventions that consist of a series of steps or acts to be performed). See 35 U.S.C. 100(b) ("The term process' means process, art, or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.").

Federal courts have held that 35 U.S.C. 101 does have certain limits. First, the phrase "anything under the sun that is made by man" is limited by the text of 35 U.S.C. 101, meaning that one may only patent something that is a machine, manufacture, composition of matter or a process. See, e.g., *Alappat*, 33 F.3d at 1542, 31 USPQ2d at 1556; *Warmerdam*, 33 F.3d at 1358, 31 USPQ2d at 1757 (Fed. Cir. 1994). Second, 35 U.S.C. 101 requires that the subject matter sought to be patented be a ">new and< useful" invention. Accordingly, a complete definition of the scope of 35 U.S.C. 101, reflecting Congressional intent, is that any new and useful process, machine, manufacture or composition of matter under the sun that is made by man is the proper subject matter of a patent.

The subject matter courts have found to be outside >of, or exceptions to,< the four statutory categories of invention is limited to abstract ideas, laws of nature and natural phenomena. While this is easily stated, determining whether an applicant is seeking to patent an abstract idea, a law of nature or a natural phenomenon has proven to be challenging. These three exclusions recognize that subject matter that is not a practical application or use of an idea, a law of nature or a natural phenomenon is not patentable. See, e.g., *Rubber-Tip Pencil Co. v. Howard*, 87 U.S. (20 Wall.) 498, 507 (1874) ("idea of itself is not patentable, but a new device by which it may be made practically useful is"); *Mackay Radio & Telegraph Co. v. Radio Corp. of America*, 306 U.S. 86, 94, 40 USPQ 199, 202 (1939) ("While a scientific truth, or the mathematical expression of it, is not patentable invention, a novel and useful structure created with the aid of knowledge of scientific truth may be."); *Warmerdam*, 33 F.3d at 1360, 31 USPQ2d at 1759 ("steps of locating' a medial axis, and creating' a bubble hierarchy . . . describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic abstract idea").



**\*\*>The courts have also held that a claim may not preempt< ideas, laws of nature or natural phenomena.** The concern over preemption was expressed as early as 1852. See *Le Roy v. Tatham*, 55 U.S. 156, 175 (1852) ("A principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right."); *Funk Brothers Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 132, 76 USPQ 280, 282 (1948) (combination of six species of bacteria held to be nonstatutory subject matter).

The Examiner Objected to the amended specification based on new matter and asked for withdraw of the amendments. Applicant states, 'A person of ordinary skill in the art would recognize that the claimed invention is applicable to many domains, including those cited by the Examiner' and 'The existence of additional unknown uses for the invention has no relevance to the validity of the claims under section 101.' The applicant admits preemption and thus violates MPEP.

The amended specification introduces a real world application which was not present in the original application which lacked a real world application and thus introduces new matter. In addition, the amended specification 'real world' application is based on 'belief' and not facts. The context 'For example, genes that appear together consistently across genomes are **believed** to be functionally related' supports the Examiner's position. Again leaning the application towards abstract concepts.

The Examiner has no idea of what is meant by the applicant's representative stating that the word 'abstract' is used in a technique sense.

The applicant's representative states "Transformation and reduction of an article 'to a different state or thing' is the clue to patentability of a process claim." The problem is nothing is being transformed or reduced. A permutation pattern goes in and a number is returned. There is no 'transforming' or 'reduction.' The returned number

Art Unit: 2129

only has an abstract function. The invention is not concrete as disclosed by the example above which also supports the returning number has a abstract function.

Applicant state the invention is a 'system describe discovering permutation patterns.' The Examiner disagrees and sees the invention only as an algorithm which renames permutation patterns (in an abstract sense) with no real world application since the resulting name is completely abstract. Office Action stands.

11. In reference to the Applicant's argument:

Independent Claims 1, 20 and 29

Independent claims 1, 20, and 29 were rejected under 35 U.S.C. § 102(b) as being anticipated by Floratos. Regarding claim 1, the Examiner asserts that Floratos teaches "using changes in the names to determine the permutation patterns" (page 457, Cl: 26-43)

Applicants note that Floratos is directed to a different problem than the present disclosure. Floratos is directed to "identifying sequence similarity between a query sequence and a database of proteins " (Page 455, first paragraph;) Floratos searches for an ordered sequence in a string. The claims of the present disclosure are directed to discovering permutation patterns. As would be apparent to a person of ordinary skill in the art, permutation patterns indicate that the patterns are related to a non-ordered set of characters. For instance, dictionary.com teaches that the permutations of (1,2,3) are (1,2,3) (2,3,1) (3,1,2) (3,2,1) (1,3,2) (2,1,3). Independent claims 1, 20, and 29 require using changes in the names to determine the permutation patterns.

Thus, Floratos does not disclose or suggest using changes in the names to determine the permutation patterns, as required by independent claims 1, 20, and 29. Dependent Claims 2-19, 21-28 and 30-35

Dependent claims 2-17, 21-26, and 30-35 were rejected under 35 U.S.C. § 102(b) as being anticipated by Floratos.

Art Unit: 2129

Claims 2-19 and 30-31, claims 21-28 and 32-33, and claims 34-35 are dependent on claims 1, 20, and 29, respectively, and are therefore patentably distinguished over Floratos because of their dependency from amended independent claims 1, 20, and 29 for the reasons set forth above, as well as other elements these claims add in combination to their base claim.

All of the pending claims, i.e., claims 1-35, are in condition for allowance and such favorable action is earnestly solicited.

Examiner's response:

Applicant argues that ordering sequence is different than a permutation pattern and thus concludes that Floratos addresses a different arena than the applicant. The Examiner disagrees. A specific ordered sequence can be seen as a single input of a permutation pattern. For example using applicant's Fig. 3A. Line 250-1 has a value of '1' under the permutation equivalent to 'b.' This can equate to an ordered sequence which is labeled 'b.' Office Action stands.

### ***Examination Considerations***

12. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. In re Morris, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. In re Prater, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The

Examiner has the full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

13. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and sprit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but link to prior art that one of ordinary skill in the art would find inherently appropriate.

14. Examiner's Opinion: Paragraphs 12 and 13 apply. The Examiner has full latitude to interpret each claim in the broadest reasonable sense.

### ***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Claims 1-35 are rejected.

#### Correspondence Information

17. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner Peter Coughlan, whose telephone number is (571) 272-5990. The Examiner can be reached on Monday through Friday from 7:15 a.m. to 3:45 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor David Vincent can be reached at (571) 272-3080. Any response to this office action should be mailed to:

Art Unit: 2129

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

Hand delivered to:

Receptionist,

Customer Service Window,

Randolph Building,

401 Dulany Street,

Alexandria, Virginia 22313,

(located on the first floor of the south side of the Randolph Building);

or faxed to:

(571) 272-3150 (for formal communications intended for entry.)

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have any questions on access to Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Examiner, Art Unit 2129

/Peter Coughlan/

/David R Vincent/

Supervisory Patent Examiner, Art Unit 2129

5/30/2008